EuroSciCon

8th Edition of International Conference on

Chemical Sciences

June 14-15, 2018
London, UK

Abel Martins Rodrigues, Arch Chem Res 2018, Volume 2
DOI: 10.21767/2572-4657-C2-006

AN EXPERIMENTAL APPROACH FOR LIQUEFACTION OF BIOMASSES FROM POPLAR SHORT ROTATION COPPICES

Abel Martins Rodrigues
INIAV, Portugal

Global renewable energy supply will increase along this century, aiming to improve the prospects of a green carbon light economy and to mitigate the atmospheric GHG (Greenhouse Gas) emissions. Biomass, is a renewable resource that, due to its local availablity and non intermittent condition, should be expected to play an prominent role. Woody short rotation coppices (SRCs), with forest species such as poplar or willow, are intensive cultivations designed to biomass production, and an open option with great potential to increase the supply of this renewable feedstock. But SRCs are not yet economically feasible, and in the countries where implementation at a commercial scale was done, public subsidies are required. Therefore, we proposed biomass liquefaction as a possible route for generation of valued added chemical products, so contributing to the economic feasibility of SRCs. The biomass liquefaction of poplar from SRCs, was performed at a lab scale reactor, under an acid catalysis with p-tolueno-sulfonic acid (3% wt to biomass weight), with a mixture of diethyleno glycol and 2-Ethylhexanol (1/3 wt to biomass weight) as a solvent. The reaction was performed at atmospferic pressure, and 160°C during 75 mins. Thereafter the mixture was cooled, filtered and washed with methanol, acetone and water. The remaing organic dark-browning liquid was dried under vacuum to give bio-oil. The conversion yield, hydroxil and acid numbers, and high heating value of biol-oil were determined and its chemical structure evaluated through ATR-FTIR (Attenuated total reflection- Fourier transform infrared spectroscopy) spectra. The conversion yield was 91% and the hydroxil and acid numbers were low, of respectivly 193 mg KOH/g and 2 mg KOH/g. The average HHV (heating value) was 35.2 MJ/kg. The hydroxil and acid numbers showed a good potential to the formulation of polyurethane foams and rigid foams and cotaings, respectively. The HHV of bio-oil, high comparatively to woody biomass, reflected its high potential for thermo-chemical conversion.

Biography

Abel Martins Rodrigues holds a MsC in Mechanical Engineering (energy profile) and PhD in environmental engineering, both degrees obtained in Instituto Suprior Técnico of Lisboa, and is a researcher in Portuguese, Instituto Nacional de Investigação Agrária for the last 34 years. His areas of research are now focused mainly in production of forest biomass for energy and in thermo-chemical biomass conversion technologies. He is author of a book "princípios fundamentais de physical ecology" ("fundamental principles of physical ecology") and author or co-author of about 40 research book chapters, articles and conference proceedings published in international and Portuguese journals.

abel.rodrigues@iniav.pt